

AN ANALYSIS OF NURSING STATE BOARD SCORES
ACCORDING TO MYERS-BRIGGS
PERSONALITY TYPES

By

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To

Mary who first sparked my
interest in research

and

Dorris who believed I could do it

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By

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Chairman: James W. Hensel

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This study was designed to test the hypothesis that there exists a relationship between Jungian psychological type, as measured by the Myers-Briggs Type Indicator of Personality Variables (MBTI) and performance on Nursing State Board Examinations.

The sample consisted of 312 students, 135 associate degree graduates, and 177 baccalaureate graduates.


As a result of MBTI testing, all participants were classified according to four dichotomous dimensions: 1. Extraversion-Introversion, 2. Sensing-Intuition, 3. Thinking-Feeling, and 4. Judging-Perceiving. Sixteen type classifications were possible.

Separate State Board scores were available for each of five subscales: 1. Medical Nursing, 2. Surgical Nursing, 3. Pediatric Nursing, 4. Obstetric Nursing, and 5. Psychiatric Nursing.

Using the Analysis of Variance, both the null hypothesis of no relationship between total Boards and psychological type and the null

hypothesis of no relationship between performance on Board subscales and psychological type were rejected at the .05 level. However, the null hypothesis that performance by type would not differ between associate degree and baccalaureate graduates could not be rejected at the .05 level.

The Scheffé Method of multiple comparison and the Median Test were used to make all pair-wise comparisons generated by classifying subjects according to one, two, and four MBTI preferences. All pair-wise comparisons fell short of significance at the .05 level. There was no one type which performed consistently higher or consistently lower on either the total or on the subscales.


Chairman

CHAPTER I

INTRODUCTION TO THE STUDY

One of the many problems continually confronting nursing educators is the prediction of student success on State Board Examinations (Boards). Each year a number of graduates challenge the Boards unsuccessfully.

The problem arises at the time students are admitted to programs of nursing education. Each year an ever increasing number of students apply for a limited number of positions in nursing schools. Admissions committees must decide which applicants, if admitted, are likely to complete the program and are likely to pass licensing examinations.

Throughout the educational program, instructors are confronted with the problem of identifying students needing remediation prior to challenging the Boards. Once identified, suitable learning experiences must be prescribed. A predictive instrument providing clues as to what educational activities would be beneficial to the candidate for remediation is needed.

And, of course, from the student's point of view, performance on Boards is also a concern. If success on Boards could be predicted on the basis of certain variables or factors, students with limited potential for satisfactory performance could be identified early for special assistance or counseled into programs for which they are better suited. Two types of programs are available to students who wish to be nurses. Associate degree programs tend to be practice oriented

while baccalaureate degree programs tend to be theory oriented.

There have been efforts to predict performance on Boards. The National League for Nursing has found scores on the Pre-Nursing Guidance Examination (PNG) to correlate positively with scores on Boards; however, the PNG does not reveal clues as to suitable remedial activities (18). The National League for Nursing Achievement Test scores have also been found to be predictive of success on Boards (2,3,19,21). The NLN Achievement battery requires academic experience in nursing; therefore, it can be used neither for admission screening nor for prescribing individual learning experiences.

Others have found verbal performance on the Scholastic Aptitude Test (SAT-V) to be a frequent significant predictor of performance on Boards (1,15,22). While SAT-V scores are often used as admission criteria, it tells nothing about individual learning styles nor is it prescriptive of learning activities to assist borderline students.

Backman and others, in addition to finding SAT-V scores helpful, found a significant positive correlation between Wechsler Adult Intelligence Scale (WAIS) and Board scores (1). Again WAIS provides no clues as to learning styles.

A review of the literature reveals only one study investigating the relationship between personality traits and performance on Boards. While this study did find I.Q. to be related positively to Board performance, investigators concluded that success or failure on Boards is independent of the types of personality traits the Minnesota Multiphasic Personality Inventory (MMPI) measures e.g., hypochondriasis, depression, hysteria, etcetera (23).

Is it possible that performance on Boards is related to how one

uses the mind rather than indices of pathological personality traits?

Jungian personality variables as measured by the Myers-Briggs Type Indicator (MBTI), and which explain how one uses the mind, have been shown to be related to academic success (6,7,12,13,14,17,20). But do some types do better in one academic setting than another?

The variables identified by the MBTI have also been used successfully to identify learning styles and to prescribe individual learning experiences (12,13,24,25,26).

If results on the MBTI can be shown to be predictive of performance on Boards, and if the predictive factors differ according to educational program, then MBTI results could be used as a tool to identify students needing special assistance, as a basis for prescribing educational experiences, and as a basis for counseling students into the appropriate educational program.

Purpose of the Study

The purpose of this study was to test the hypothesis that there exists a relationship between Jungian psychological type and performance on State Board Examinations for nursing.

It was also the purpose of this study to determine the value of the Myers-Briggs Type Indicator in predicting Board performance by type of program.

Questions for Study

This study sought to find answers to the following questions:

1. Can psychological types be identified that perform significantly different than other types on Boards?
2. Are there types that perform consistently well on Boards or on sections of Boards?
3. Are there types that score consistently low on Boards or on sections of Boards?
4. Is performance on Boards by type independent of educational setting?

Delimitations of the Study

This study was delimited to 135 nurses who graduated from Santa Fe Community College, Gainesville, Florida, during the years 1972 through 1974; and to 177 nurses who graduated from the University of Florida during the same years. Only graduates who had taken both the Myers-Briggs Type Indicator and Boards were included.

Definition of Terms

For the purposes of this study these definitions will be used.

Associate Degree Graduate - An individual graduated from a Junior College program of nursing.

Baccalaureate Degree Graduate - An individual graduated from a Senior College program of nursing.

State Board Examination or Boards - A national, objective examination designed to assess competence on five subscales.

Extraversion or Introversion Preference - This preference affects an individual's choice whether to direct perception and judgment upon

the environment or the world of ideas.

• Extraverts - People who prefer the outer world of people and things.

Introverts - People who prefer the inner world of ideas and concepts.

Sensing or Intuition Preference - This preference affects an individual's choice of which of these two kinds of perception to rely on.

Sensing - The preference whereby one becomes aware of things directly through the five senses and direct experience.

Intuition - The preference which filters the perceived data through the unconscious, where ideas, relationships, and associations are added.

Thinking or Feeling Preference - This preference affects an individual's choice of which of these two kinds of judgment to rely on.

Thinking - A judging function, which is a logical process aimed at an impersonal finding.

Feeling - A judging function, which is a process of appreciation, bestowing on things a personal subjective value.

Judgment or Perception Preference - This preference affects an individual's choice whether to use a judging or perceptive attitude in dealing with the environment.

Judgment - The process of coming to a conclusion about what has been perceived.

Perception - The process of becoming aware--of things, people, occurrences, or ideas.

Judging Attitude - Attitude, using thinking or feeling, whereby

an individual will live in a planned, decided, orderly way, aiming to regulate life and control it.

Perceptive Attitude - Attitude, using sensing or intuition, whereby an individual will live in a flexible, spontaneous way, aiming to understand life and adapt to it.

Psychological Type, Personality Type, or Type - Four letters which represent the product of a person's conscious orientation to life, his habitual, purposeful ways of using his mind, chosen because it seems to him to be good, interesting, and trustworthy (17, p. 74).

Need for the Study

Efforts to find instruments predictive of performance on Boards have tended to focus on aptitude and achievement tests. While these tests have demonstrated predictive value, they are of limited value in identifying learning styles and in prescribing suitable remedial activities. In addition, several instruments rely on some experience in nursing education and cannot be utilized for admission counseling or for early diagnostic work.

At the same time, there has been a paucity of effort to investigate the relationship of psychological type to performance on Boards. Type can be ascertained prior to admission, can be used to identify learning styles, and can be used to prescribe suitable learning activities. An instrument that is both predictive and diagnostic would be of value to nursing students and nursing educators.

There is also a need to know whether or not students perform differently by type depending upon their educational program. If so, students could be counseled into programs most beneficial for their type.

CHAPTER II

REVIEW OF RELATED LITERATURE

Although the literature overlaps, two major areas of research can be identified: (1) Jung's theory of psychological type; and (2) research exploring the relationship of type to scholastic performance.

Jungian Concepts

According to Jung's theory (5,8,9,28,29), the differences in the way people prefer to use perception and judgment causes much variation in human behavior.

Basically, there are two ways in which people perceive or become aware of objects, people, events, and ideas. One way is by using the five senses. Individuals who prefer to use their five senses for perception are said to be Sensing types (S) and their preferred mode of perception orients them toward the immediate, the real, tangible, solid facts of experience.

The alternative method of becoming aware is through Intuition (N). If one prefers intuition as the major means of perception, one tends to focus on possibilities, meanings, and relationships of facts and experience, usually with little interest in the facts themselves.

There are also two ways in which people judge or come to conclusions about what they perceive. One way is to analyze and evaluate the

logical consequences. Individuals who prefer this mode of judging and who make decisions objectively and impersonally are said to be Thinking types (T).

The alternative method of coming to conclusions is through Feeling (F). Feeling types tend to prefer making decisions by evaluating the importance of alternatives to oneself or others, and making decisions by weighing relative values.

There are two rival fields for the use of one's perception and judgment. A typical direction of attention to the outer world of objects, people, and action is a preference for Extraversion (E). A pull to the inner world of ideas and contemplation is a preference for Introversion (I).

The remaining preference is between perception and judgment as a way of life, a method of dealing with the surrounding world. A preference for a life that is organized, systematic and planned is a preference for a Judging (J) way of life. A Perceptive (P) way of life is a preference for a life that is adaptive, flexible, and spontaneous.

Jung's theory assumes that a mature person uses all eight of the above readily and effectively as the occasion demands. That is:

. . . one sometimes takes the Extraverted attitude with his attention on what is outside himself, and sometimes takes the Introverted attitude with his attention on the ideas within his head. He at times focuses his perception on what the situation actually is, and at other times is seeing what it might become. He sometimes makes decisions logically and impartially, and at other times by choosing what he cares most deeply about. He sometimes is systematic and controlled, and at other times can be adaptable and spontaneous (14, p.3).

The theory also assumes that one pole of each preference has greater natural appeal, and that an individual, unless hindered, will use the preferred way whenever he can, developing it and strengthening it through use. One's preference and development of E or I, S or N, T or F, and J or P determine one's psychological type. Altogether sixteen characteristic types are possible.

One's orientation to the world, E or I, permeates one's daily life. Together, perception and judgment constitute a large portion of the individual's total mental functioning. They must also govern a large portion of his outer behavior, since by definition his perception determines what he sees in a situation and his judgment determines what he decides to do about it. Is it not possible then, that performance on Boards is influenced by preferred modes of perceiving and judging?

Relationship of Type to Scholastic Performance

Studies reported show type classifications to be related to two distinct factors which contribute to scholastic performance: (1) aptitude, and (2) achievement.

Aptitude

Data collected by Holland and Nichols from a random sample of 100 male, National Merit Finalists showed a predominance of Introverted and Intuitive types. Fifty-eight percent of the sample were Introverted and 83% were Intuitive (20). These two indices tend to be found less frequently in general population distributions. According to Myers, the preponderance of Introverted and Intuitive types among the

the National Merit Finalists suggests that scholastic achievement as measured by the SAT is associated with these two types (17).

Myers' own sample of eleven classes from eight liberal arts and engineering colleges showed scores for students having Introversion, Intuition, or Perceptive preferences to be deviated significantly ($P=.01$) upward from the mean SAT-V for the class as a whole. The differences for the Thinking or Feeling preference were less consistent and fell short of significance ($P=.05$) for engineering students (17).

Similar results were reported by McCaulley. Mean SAT-V scores for a sample of 1107 freshmen at the University of Florida gave Introverts an advantage of 27.2 points over Extraverts, Intuitives an advantage of 42.9 points over Sensings, and Perceptives an advantage of 15.1 points over Judging types. Little difference could be seen between Thinking and Feeling types (14). McCaulley's findings confirm the results of an earlier study of Auburn University freshmen conducted by Grant (7).

Conary studied educational variables of 1708 Auburn University freshmen using rank correlation techniques. Results showed mean scores for Introverted Intuitive types to be significantly ($P=.05$) higher than mean scores for Extraverted Sensing types on the American College Test (6).

Type has been correlated with scores on Terman's Concept Mastery Test for a sample of male freshmen at Brown University and a similar sample at Wesleyan University. On Terman's Concept Mastery Test, which is designed to measure the highest ranges of vocabulary and verbal reasoning, Introvert males appear to equal or even excel Intuitive males. In the two male freshman classes for which Concept Mastery scores are

available, the Introverts' advantage was 12.2 points at Brown compared with the Intuitives' 11.3 points, and 14.8 points at Wesleyan compared with 11.4 points. This finding is in accord with Introverts' postulated interest in concepts and ideas (17). It should be noted, however, that the Concept Mastery Test is not timed, so that the Intuitives' speed is of no particular asset, and the Introverts' depth can be fully utilized.

Regression curves of the Concept Mastery scores for the Brown freshmen upon Sensing and Intuition have been plotted separately for Extraverts and for Introverts. For Extraverts, a mild preference for Intuition appears to contribute nothing at all to mastery of the concepts used in the test. On the other hand, for Introverts, each increment in Intuition raises the mean Concept Mastery score above the average. Thus evidence suggests that Introverts use their minds, including their Intuition, in a way that is different and advantageous for dealing with intricacies of language and thought (17).

The literature contains fewer references to the relationship between I.Q. and type. Myers, however, observes that Introverts with Intuition have the highest mean I.Q. based on regression curves plotted for 3503 male college preparatory students (17).

Achievement

Achievement is another criterion of scholastic success. Grade point average of high school and college students provide evidence of achievement.

Myers shows correlations of grade point average with type preference for seven male samples from liberal arts colleges, four

engineering colleges, and one school of finance and commerce; a liberal arts college for women; a large sample of male high school students; and for a large sample of female high school students. From these correlations, it appears that Introverts and Intuitives tend to have higher grades (as would be expected from their higher aptitude) than Extraverts or Sensing types. While correlations for Introverts and Intuitives are consistent for all 15 samples, correlations fall short of significance at the .05 level for 7 samples on Introversion and for 6 samples on Intuition. Correlations with the Judging attitude also indicate that Judging students tend to have higher grades (in spite of lower aptitude.) Correlations with the Judging attitude are significant at the .05 level for 11 of the 15 samples. Correlations with the Thinking-Feeling preference are smaller and, like the correlations with aptitude, somewhat less consistent (17).

Studying first quarter grade point averages for college freshmen, McCaulley reports that Introverted Intuitive types ranked highest, holding the first four places on an ordinal scale of sixteen types. McCaulley's data tend to support that of Myers with Introverts having mean grade point averages higher than Extraverts, Intuitives Higher than Sensing, Judging higher than Perceptive, and no difference between Thinking and Feeling. The mean GPA for the highest ranking type, INTP, was 2.78, and for the lowest, ESTP, 2.40. The investigator states that ESTP and ESFP are the most academically vulnerable--"their practical, action-oriented, sociable, spontaneous style is not conducive to long hours in libraries" (14, p.28).

Among the Auburn University freshmen studied by Conary, Intuitive Thinking types were found to have a significantly ($P=.05$) larger

representation in the grade point range of 2.00-3.00 while Sensing Feeling types were found to have a significantly ($P=.05$) larger representation in the grade point range of 0.00-1.00 than would be empirically expected (6). These findings tend to support the theory that Thinking intuitors achieve differently than Feeling sensors; however, since the preferences for Thinking and Feeling were not studied separately from Intuition and Sensing, it is not known, from Conary's research, to what extent Thinking and Feeling influence grades.

Stricker and others investigated the ability of the Myers-Briggs Type Indicator to predict grades at Wesleyan and Caltech. Preferences for Introversion and for Judgment correlated significantly ($P=.05$) at Wesleyan. Correlations were generally lower in the Caltech sample but the same preferences correlated significantly at the .05 level. The investigators concluded that the Indicator had some ability to predict grade point average, but "this ability varied with ... the sample (27, p. 1094).

Summary

In summary the literature reviewed indicates that:

1. Behavior is influenced by preferred methods of using perception and judgment, and by an Extraverted or Introverted orientation to the world.
2. Aptitude is enhanced by a preference for Introversion, Intuition, and Perception.
3. Achievement is enhanced by a preference for Introversion, Intuition, and Judgment.

4. A preference for Thinking or Feeling contributes less significantly to scholastic performance.

CHAPTER III

METHOD OF STUDY

This study was designed to explore the relationship between performance on the MBTI and performance on Boards.

The overall hypothesis yielded the following null hypotheses to be tested:

1. There is no significant relationship between performance on the State Board Examination and psychological type.
2. There is no significant relationship between performance on the subscales of the State Board Examination and psychological type.
3. There is no one type which performs consistently higher on the State Board Examination.
4. There is no one type which performs consistently higher on the subscales of the State Board Examination.
5. There is no one type which performs consistently lower on the State Board Examination.
6. There is no one type which performs consistently lower on the subscales of the State Board Examination.
7. Performance by type does not differ between associate degree and baccalaureate degree graduates.

Two instruments were used to collect data. The MBTI was administered to all participants while attending nursing school. The State Board Examination, consisting of five subtests, was taken by all participants following graduation.

The Myers-Briggs Type Indicator

The MBTI was developed by Mrs. Isabel Briggs Myers and her mother, Mrs. Katherine C. Briggs, and first published by the Educational Testing Service, Princeton, New Jersey, in 1962. Based on the personality theory of Carl Jung (8), it was designed to identify preferences for four dichotomous dimensions: 1. Extraversion-Introversion, 2. Sensing-Intuition, 3. Thinking-Feeling, and 4. Judging-Perceiving. The Extraversion (E) - Introversion (I) preference indicates the respondent's direction of interest toward the outer world of people, action, and things or toward the inner world of ideas. The Sensing (S) - Intuition (N) preference indicates the individual's manner of obtaining information, either through direct experience or through inferred meaning. The Thinking (T) - Feeling (F) preference identifies the way in which the individual makes decisions, either on the basis of logical order or personal importance. The Judging (J) - Perceiving (P) preference indicates the individual's attitude toward the outside world, either planned and orderly or flexible and spontaneous. Thus there are two modes of judging--Thinking and Feeling, and two modes of perceiving--Sensing and Intuition. Which of these is the dominant or most preferred process is determined by the preference for Extraversion or Introversion. While everyone uses all of

the eight processes at some time or another during his daily life, he prefers one of the two processes representing each dimension, and, it may be assumed, is more comfortable and effective when utilizing his preferences.

The MBTI is a 166 item, forced choice inventory which may be self-administered in about 45 minutes. In a description of the Indicator, McCaulley stated:

Each question was selected for a specific theoretical reason ... designed to be nonthreatening [and] without pathological orientation ... [and each item choice was] designed to be equally attractive to the type to whom it was directed (11, p. 1).

There are two types of items--phrases and word pairs--each of which is scored on only one index. Total scores are obtained for each of the eight processes, and the larger score of each pair is considered representative of the respondent's preferred process.

The respondent's personality type may then be indicated by the four letters identifying his preferences, E or I, S or N, T or F, and J or P. The sixteen possible combinations of preferences are presented in Figure 1. Each of the type combinations has characteristic personality features. Myers (17, p. 70-71) has developed descriptions of each type, and a condensed version has been included in Appendix A. The manifestation of personality type is determined by the interaction of the four preferences. Some effects of the combinations of perception and judgment are summarized in Appendix A.

National norms for the Indicator have been developed by Myers (17), as well as distributions of the 16 types among selected educational

| | ST | SF | NF | NT |
|------|------|------|------|------|
| I--J | ISTJ | ISFJ | INFJ | INTJ |
| I--P | ISTP | ISFP | INFP | INTP |
| E--P | ESTP | ESFP | ENFP | ENTP |
| E--J | ESTJ | ESFJ | ENFJ | ENTJ |

FIGURE 1. PERSONALITY TYPE*

* I.B. Myers, Introduction To Type (Swarthmore, Pennsylvania: By the Author, 1970), (16, p.3).

levels and occupational areas, which indicated that there are approximately three extraverts to one introvert, and three persons who prefer sensing to one who prefers intuition in the general population. Also, more men prefer thinking and more women prefer feeling as a basis for decision-making.

Reliability of the Indicator has been determined by split-half tetrachoric correlations and application of the Spearman-Brown Prophecy Formula. Most reliabilities of the indices are .75 or better, and the reported median reliability is .83 (17, p.20). Buros (4) considered these reliabilities comparable to those calculated from continuous scores, and to other similar self-report instruments.

Myers (17) has provided considerable evidence for concurrent validity of the Indicator by correlations with other instruments as

well as additional measures such as faculty ratings, job turnover, and creativity. Also, evidence for construct validity was obtained from correlations, corrected for differing reliabilities and attenuation, of .97 or better with the Gray Wheelwright Psychological Type Questionnaire which was also based on Jungian personality theory and developed independently of the MBTI. Relative to construct validity, Buros (4) indicated that the SN and TF scales probably represented the theoretical dimensions while the EI and JP scales were more questionable.

The State Board Examination

The State Board Examination for nursing graduates is a standardized test which consists of five subtests to assess competence in 1. Medical Nursing, 2. Surgical Nursing, 3. Pediatric Nursing, 4. Psychiatric Nursing, and 5. Obstetric Nursing. Each section contains 90 to 120 objective, multiple choice questions. Administration is timed. Depending upon the number of questions on a subtest, 90 to 120 minutes may be permitted. Those finishing a subtest early are not permitted to leave the testing area until the full time period has expired.

The Board was developed as a part of the National League for Nursing (NLN) Test Pool and all fifty states contract with the NLN for use of the examination. Satisfactory performance indicates that a practitioner meets legal requirements for safe practice. Unlike achievement tests designed to measure maximum performance, Boards are designed to test minimum competence.

Each subtest contains questions designed to test the cognitive areas of knowledge, application, and evaluation. Alternate forms of the subtests are used on a rotating basis.

Description of the Sample

Three hundred and twelve graduates from two schools were involved in this study. This total includes 135 associate degree (Santa Fe Community College) graduates and 177 baccalaureate (University of Florida) graduates. Of the associate degree graduates, 20 were black females and nine were white males. All the rest were white females. Six of the baccalaureate graduates were black females and 10 were white males. The rest were white females. Because of the small number of males and blacks available, no attempt was made to achieve a better balance between the sexes or the races. Table 1 shows the distribution of graduates by school, sex, age, and race. In this study, age refers to the age of subjects, in years, at the time they entered their nursing major.

TABLE 1. DISTRIBUTION OF GRADUATES BY SCHOOL, SEX, AGE,* AND RACE

| | Santa Fe | | | | University of Florida | | | |
|--------------------|----------|--------|-------|--------|-----------------------|--------|-------|--------|
| | White | | Black | | White | | Black | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| 21 years and older | 8 | 57 | - | 16 | 10 | 53 | - | 5 |
| Under 21 | 1 | 49 | - | 4 | - | 108 | - | 1 |

* Represents age in years at time of admission to nursing program.

Only those graduates for whom both MBTI and Board scores were available were included in the study. Due to the small number of graduates available in several of the type classifications, random selection proved to be impossible.

Collection of Data

Psychological Type

The data on psychological type were obtained by using the Myers-Briggs Type Indicator. The MBTI was administered as a part of a routine testing program in both schools. Results were available for all participants upon request.

As a result of testing, participants were classified according to four dichotomous dimensions: 1. Extraversion-Introversion, 2. Sensing-Intuition, 3. Thinking-Feeling, and 4. Judging-Perceiving. Combining the four letters identifying participants' preferences resulted in sixteen type classifications. The distribution of types by school is shown in Table 2. Additional tables illustrating the distribution of type by age, sex, race, and school are contained in Appendix B.

State Board Scores

The State Board Examination, challenged after graduation, provided the rest of the data. Separate scores were available for each of the five subscales: 1. Medical Nursing, 2. Surgical Nursing, 3. Pediatric Nursing, 4. Psychiatric Nursing, and 5. Obstetric Nursing. The five subscale scores were collected individually and combined to determine a total Board score for each participant.

TABLE 2. DISTRIBUTION OF TYPES BY SCHOOL

| | ISTJ | | ISFJ | | INFJ | | INTJ | |
|-----------------------|------|----|------|-----|------|-----|------|----|
| University of Florida | N=9 | 5% | N=21 | 12% | N=13 | 7% | N=4 | 2% |
| Santa Fe | N=9 | 7% | N=18 | 13% | N=6 | 4% | N=2 | 1% |
| | ISTP | | ISFP | | INFP | | INTP | |
| University of Florida | N=2 | 1% | N=14 | 8% | N=21 | 12% | N=6 | 3% |
| Santa Fe | N=3 | 2% | N=7 | 5% | N=13 | 10% | N=2 | 1% |
| | ESTP | | ESFP | | ENFP | | ENTP | |
| University of Florida | N=3 | 2% | N=9 | 5% | N=26 | 15% | N=5 | 3% |
| Santa Fe | N=2 | 1% | N=7 | 5% | N=17 | 13% | N=6 | 4% |
| | ESTJ | | ESFJ | | ENFJ | | ENTJ | |
| University of Florida | N=10 | 6% | N=18 | 10% | N=15 | 8% | N=1 | 1% |
| Santa Fe | N=10 | 7% | N=25 | 19% | N=7 | 5% | N=1 | 1% |

Treatment of Data

Hypotheses numbers one and two were tested with analysis of variance using the F statistic and with the Median Test to determine the relationship between performance on Boards and psychological type.

Hypotheses three through six were tested using the Scheffé Method of multiple comparisons and the Median Test to determine which psychological types perform differently on Boards.

Hypothesis number seven was also tested using analysis of variance techniques to determine whether the relationship between type and performance on Boards is the same for associate degree and baccalaureate degree graduates.

In addition, Chi Square, measures of central tendency, and percents were used to check for confounding variables.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

The data consist of State Board Examination scores and MBTI psychological type for 177 baccalaureate (University of Florida) and 135 associate degree (Santa Fe Community College) graduates. The Board data consist of scores on five subscales: 1. Medical Nursing, 2. Surgical Nursing, 3. Pediatric Nursing, 4. Obstetric Nursing, and 5. Psychiatric Nursing. The MBTI data consist of 16 type classifications according to Extraversion (E) or Introversion (I), Sensing (S) or Intuition (N), Thinking (T) or Feeling (F), and Perception (P) or Judgment (J). In addition, the sex, age, and race of each subject was recorded.

The object of this analysis was to find the relationships, if any, between Board scores and personality type. It was also the object of this analysis to discover if these relationships were different for baccalaureate graduates than for associate degree graduates.

More specifically, it was the object of this analysis to test the following seven null hypotheses:

1. There is no significant relationship between performance on the State Board Examination and psychological type.
2. There is no significant relationship between performance on the subscales of the State Board Examination and psychological type.

3. There is no one type which performs consistently higher on the State Board Examination.
4. There is no one type which performs consistently higher on the subscales of the State Board Examination.
5. There is no one type which performs consistently lower on the State Board Examination.
6. There is no one type which performs consistently lower on the subscales of the State Board Examination.
7. Performance by type does not differ between associate degree and baccalaureate degree graduates.

Analysis of the Data

As a preliminary check for confounding variables, the University of Florida population and the Santa Fe population were compared with respect to the distribution of age, sex, and race. Several differences were noted with respect to race and age but not sex. There are significantly more blacks in the Santa Fe population ($P=.05$). The Santa Fe population is older on the average ($P=.05$) and more variable with respect to age than the University of Florida population. The figures are summarized in Table 3.

Next the two populations were compared with respect to distribution of type. The Chi Square test of independence was used for this comparison. The Chi Square statistic, calculated at 10.91 with 15 degrees of freedom, fell short of significance at the .05 level. A comparison of ESFJ types at both schools, however, revealed significantly more ($P=.05$) ESFJ types in the Santa Fe population than in the

TABLE 3. COMPARISON OF POPULATIONS ACCORDING TO SEX, RACE, AND AGE

| | <u>Santa Fe</u> | <u>U. of F.</u> |
|--------------|-----------------|-----------------|
| Total Sample | 135 | 177 |
| % Male | 6.7 | 5.6 |
| % Female | 93.3 | 94.4 |
| % White | 85.2 | 96.6 |
| % Black | 14.8* | 3.4 |
| Age | | |
| Mean | 24.6* | 20.88 |
| S.D. | 6.93* | 2.15 |
| Range | 17-46 | 19-34 |

* Significant at the .05 level.

University of Florida population. Generally, the distribution of types in the University of Florida population appears to be the same as in the Santa Fe population. The exception is that there are significantly more ESFJ types in the Santa Fe population.

The two populations were also compared with respect to Board scores both for total score and for subscale scores holding type constant. Using a two-factor Analysis of Variance and a .05 level of significance, there is no difference between the Santa Fe and the University of Florida populations on Medical score, Surgical score, Pediatric score, Obstetric score, or on total score. These results are summarized in Tables 4 through 8. There is a difference on Psychiatric score (Table 9) with the University of Florida having the highest mean.

Table 10 summarizes the mean scores for both schools.

The same Analysis of Variance was used to test for interaction between school and type. From Tables 4 through 8 it can be seen that there is no significant interaction. In other words, Board scores are related to psychological type in the same way at both schools. Consequently, the hypothesis that performance by type would not differ between associate degree and baccalaureate degree graduates failed to be rejected.

TABLE 4. ANALYSIS OF VARIANCE TABLE FOR MEDICAL SCORES

| Source | df | SS | | MS | F Value |
|-----------------|-----|------------------|---------|---------------|---------|
| Regression | 31 | 474,470.65 | | 15,305.50 | 1.63* |
| Error | 280 | 2,626,087.65 | | 9,378.88 | |
| Corrected Total | 311 | 3,100,558.30 | | | |
| | df | Sequential SS | F Value | Partial MS | F Value |
| School | 1 | 67,918.53 | 7.24 | 10,633.33 | 1.13 |
| MBTI | 15 | 261,014.03 | 1.86 | 290,839.34 | 2.07* |
| School x MBTI | 15 | 145,538.09 | 1.03 | 145,538.09 | 1.03 |

* Significant at .05 level.

TABLE 5. ANALYSIS OF VARIANCE TABLE FOR SURGICAL SCORES

| Source | df | SS | MS | F Value |
|-----------------|-----|--------------|-----------|---------|
| Regression | 31 | 331,822.54 | 10,703.95 | 1.17 |
| Error | 280 | 2,570,664.05 | 9,180.94 | |
| Corrected Total | 311 | 2,902,486.59 | | |

| | df | Sequential SS | F Value | Partial MS | F Value |
|---------------|----|------------------|---------|---------------|---------|
| School | 1 | 38,120.68 | 4.15 | 5,446.05 | 0.59 |
| MBTI | 15 | 125,815.81 | 0.91 | 147,000.06 | 1.07 |
| School x MBTI | 15 | 167,886.05 | 1.22 | 167,886.05 | 1.22 |

TABLE 6. ANALYSIS OF VARIANCE TABLE FOR PEDIATRIC SCORES

| Source | df | SS | MS | F Value |
|-----------------|-----|--------------|-----------|---------|
| Regression | 31 | 512,486.46 | 16,531.82 | 1.87* |
| Error | 280 | 2,476,485.39 | 8,844.59 | |
| Corrected Total | 311 | 2,988,971.85 | | |

| | df | Sequential SS | F Value | Partial MS | F Value |
|---------------|----|------------------|---------|---------------|---------|
| School | 1 | 116,153.12 | 13.13 | 28,841.79 | 3.26 |
| MBTI | 15 | 264,719.31 | 2.00 | 285,743.67 | 2.15* |
| School x MBTI | 15 | 131,614.03 | 0.99 | 131,614.03 | 0.99 |

* Significant at .05 level.

TABLE 7. ANALYSIS OF VARIANCE TABLE FOR OBSTETRIC SCORES

| Source | df | SS | MS | F Value |
|-----------------|-----|--------------|-----------|---------|
| Regression | 31 | 516,704.74 | 16,667.89 | 1.91* |
| Error | 280 | 2,442,801.92 | 8,724.29 | |
| Corrected Total | 311 | 2,959,506.66 | | |

| | df | Sequential SS | F Value | Partial MS | F Value |
|---------------|----|------------------|---------|---------------|---------|
| School | 1 | 99,873.96 | 11.4 | 13,947.22 | 1.60 |
| MBTI | 15 | 248,507.24 | 1.90 | 278,039.39 | 2.12* |
| School x MBTI | 15 | 168,323.55 | 1.29 | 168,323.55 | 1.29 |

* Significant at .05 level.

TABLE 8. ANALYSIS OF VARIANCE TABLE FOR PSYCHIATRIC SCORES

| Source | df | SS | MS | F Value |
|-----------------|-----|--------------|-----------|---------|
| Regression | 31 | 968,520.84 | 31,242.61 | 3.58* |
| Error | 280 | 2,441,953.16 | 8,721.26 | |
| Corrected Total | 311 | 3,410,474.00 | | |

| | df | Sequential SS | F Value | Partial MS | F Value |
|---------------|----|------------------|---------|---------------|---------|
| School | 1 | 415,636.54 | 47.66 | 83,643.66 | 9.59* |
| MBTI | 15 | 347,351.21 | 2.66 | 407,671.77 | 3.12* |
| School x MBTI | 15 | 205,533.09 | 1.57 | 205,533.09 | 1.57 |

* Significant at .05 level

TABLE 9. ANALYSIS OF VARIANCE TABLE FOR TOTAL BOARD SCORES

| Source | df | SS | MS | F Value |
|-----------------|-----|---------------|------------|---------|
| Regression | 31 | 11,775,217.09 | 379,845.71 | 2.35* |
| Error | 280 | 45,337,494.90 | 161,919.62 | |
| Corrected Total | 311 | 55,112,711.99 | | |

| | df | Sequential SS | F Value | Partial MS | F Value |
|---------------|----|------------------|---------|---------------|---------|
| School | 1 | 3,088,443.03 | 19.07 | 568,598.31 | 3.51 |
| MBTI | 15 | 5,359,858.10 | 2.21 | 6,067,946.86 | 2.50* |
| School x MBTI | 15 | 3,326,915.96 | 1.37 | 3,326,915.96 | 1.37 |

* Significant at .05 level.

TABLE 10. MEAN BOARD SCORES BY SCHOOL

| | Medical | Surgical | Pediatric | Obstetric | Psychiatric | Total |
|-----------------|---------|----------|-----------|-----------|-------------|--------|
| <u>Santa Fe</u> | | | | | | |
| Mean | 470.9 | 479.5 | 491.0 | 488.6 | 479.2 | 2409.2 |
| S.D. | 8.34 | 8.25 | 8.09 | 8.04 | 8.04 | 34.63 |
| <u>U. of F.</u> | | | | | | |
| Mean | 500.7 | 501.8 | 530.0 | 524.7 | 552.9 | 2610.1 |
| S.D. | 7.28 | 7.20 | 7.07 | 7.02 | 7.02 | 30.25 |

Table 9 summarizes the sources of variance in total Board scores. An F value significant at the .05 level was obtained for MBTI type on the Analysis of Variance. Therefore, it was possible to reject the hypothesis of no relationship between performance on Boards and psychological type.

It was also possible to reject the second hypothesis of no relationship between performance on subscales and psychological type. Significant F values ($P=.05$) for MBTI type were obtained for Medical scores, Pediatric scores, Obstetric scores, and Psychiatric scores. These results are shown on Tables 4, 5, 6, and 8.

The Analysis of Variance of Surgical Scores (Table 5) failed to obtain an F value significant at the .05 level. Therefore, it was possible to reject hypothesis number two only for four of five subscales.

To determine which psychological types have different scores, specific types were compared using the Scheffe Method of multiple comparison. Comparisons were made for each of the five subscales as well as for the total Board score. Included were:

1. All pair-wise comparisons generated by classifying subjects according to only one MBTI preference, e.g. E vs I, S vs N, et cetera.
2. All pair-wise comparisons generated by classifying subjects according to two MBTI preferences, e.g. EN vs ES, IN vs EN, et cetera.
3. All pair-wise comparisons generated by classifying subjects according to all four MBTI preferences, e.g. ISTJ vs ESTJ, ENFP vs ESTJ, et cetera.

All pair-wise comparisons fell short of significance at the .05 level. Because sample sizes were reduced when doing pair-wise comparisons, the differences between types would have to be large to be significant.

Based on the Scheffé Method of multiple comparisons, it was not possible to identify types which perform consistently higher or lower than other types on Boards or on subscales of Boards; therefore, hypotheses three through six were not rejected. (See tables in Appendix C.)

From Tables 11 through 16 it can be seen that some types tend to rank higher than other types. It can also be seen that rank order position is inconsistent from subscale to subscale. Sample sizes are small and differences between high and low types are not significant.

The Median test was also used to compare all 16 MBTI types on total score and on each of the five subscales. The Median Test results in a Chi Square statistic are summarized in Table 17. As with the Scheffé Method of multiple comparisons, sample sizes were too small to detect significant differences.

The Median scores on all subscales and on total Boards are listed for all 16 types on Table 18.

Consideration of Race

Due to small sample size, blacks were not analyzed separately. Levy and others (10) have found the MBTI to be a psychometrically stable instrument when applied to black populations; however, to provide educational opportunities to minorities, there has been a tendency in past years to use different admissions criteria for blacks. Analysis of Variance proceedings were done for whites only to control for a possible sampling bias.

TABLE 11. RANK ORDER OF TYPES BY MEAN MEDICAL SCORES

| | ISTJ | | | ISFJ | | | INFJ | | | INTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 9 | 526.0 | 3 | 21 | 459.0 | 14 | 13 | 539.2 | 2 | 4 | 567.0 | 1 |
| Santa Fe | 9 | 461.0 | 13 | 18 | 451.9 | 14 | 6 | 497.8 | 5 | 2 | 636.5 | 1 |

| | ISTP | | | ISFP | | | INFP | | | INTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 2 | 520.0 | 5 | 14 | 480.9 | 12 | 21 | 517.1 | 6 | 6 | 505.7 | 8 |
| Santa Fe | 3 | 463.7 | 12 | 7 | 467.4 | 10 | 13 | 443.8 | 15 | 2 | 532.5 | 2 |

| | ESTP | | | ESFP | | | ENFP | | | ENTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 3 | 439.7 | 15 | 9 | 499.2 | 9 | 26 | 522.3 | 4 | 5 | 494.2 | 10 |
| Santa Fe | 2 | 484.5 | 6 | 7 | 341.1 | 16 | 17 | 530.5 | 3 | 6 | 505.7 | 4 |

| | ESTJ | | | ESFJ | | | ENFJ | | | ENTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 10 | 483.5 | 11 | 18 | 473.5 | 13 | 15 | 509.5 | 7 | 1 | 436.0 | 16 |
| Santa Fe | 10 | 464.4 | 11 | 25 | 468.0 | 9 | 7 | 470.9 | 8 | 1 | 476.0 | 7 |

TABLE 12. RANK ORDER OF TYPES BY MEAN SURGICAL SCORES

| | ISTJ | | | ISFJ | | | INFJ | | | INTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 9 | 536.0 | 4 | 21 | 494.9 | 10 | 13 | 547.7 | 2 | 4 | 536.2 | 3 |
| Santa Fe | 9 | 461.0 | 13 | 18 | 460.5 | 13 | 6 | 568.5 | 2 | 2 | 524.0 | 3 |

| | ISTP | | | ISFP | | | INFP | | | INTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 2 | 576.5 | 1 | 14 | 472.9 | 14 | 21 | 508.6 | 7 | 6 | 495.3 | 9 |
| Santa Fe | 3 | 444.0 | 15 | 7 | 502.1 | 6 | 13 | 459.2 | 14 | 2 | 466.5 | 10 |

| | ESTP | | | ESFP | | | ENFP | | | ENTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 3 | 452.0 | 15 | 9 | 515.3 | 5 | 26 | 489.7 | 12 | 5 | 473.0 | 13 |
| Santa Fe | 2 | 467.0 | 9 | 7 | 384.6 | 16 | 17 | 520.6 | 4 | 6 | 491.0 | 7 |

| | ESTJ | | | ESFJ | | | ENFJ | | | ENTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 10 | 508.8 | 6 | 18 | 491.5 | 11 | 15 | 497.0 | 8 | 1 | 435.0 | 16 |
| Santa Fe | 10 | 464.6 | 11 | 25 | 470.6 | 8 | 7 | 514.3 | 5 | 1 | 631.0 | 1 |

TABLE 13. RANK ORDER OF TYPES BY MEAN PEDIATRIC SCORES

| | ISTJ | | | ISFJ | | | INFJ | | | INTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 9 | 560.6 | 4 | 21 | 492.4 | 15 | 13 | 563.6 | 3 | 4 | 623.0 | 1 |
| Santa Fe | 9 | 460.1 | 13 | 18 | 458.0 | 14 | 6 | 543.3 | 6 | 2 | 608.0 | 1 |

| | ISTP | | | ISFP | | | INFP | | | INTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 2 | 570.0 | 2 | 14 | 516.9 | 11 | 21 | 547.7 | 5 | 6 | 536.8 | 7 |
| Santa Fe | 3 | 452.0 | 15 | 7 | 487.0 | 8 | 13 | 481.6 | 10 | 2 | 549.5 | 4 |

| | ESTP | | | ESFP | | | ENFP | | | ENTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 3 | 509.0 | 13 | 9 | 522.0 | 10 | 26 | 543.3 | 6 | 5 | 524.8 | 9 |
| Santa Fe | 2 | 463.0 | 12 | 7 | 386.3 | 16 | 17 | 538.9 | 7 | 6 | 556.3 | 3 |

| | ESTJ | | | ESFJ | | | ENFJ | | | ENTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 10 | 512.3 | 12 | 18 | 499.9 | 14 | 15 | 528.5 | 8 | 1 | 476.0 | 16 |
| Santa Fe | 10 | 463.6 | 11 | 25 | 484.9 | 9 | 7 | 546.1 | 5 | 1 | 592.0 | 2 |

TABLE 14. RANK ORDER OF TYPES BY MEAN OBSTETRIC SCORES

| | ISTJ | | | ISFJ | | | INFJ | | | INTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 9 | 574.9 | 1 | 21 | 499.1 | 13 | 13 | 557.2 | 3 | 4 | 559.3 | 2 |
| Santa Fe | 9 | 486.6 | 10 | 18 | 441.8 | 15 | 6 | 527.2 | 4 | 2 | 621.5 | 1 |

| | ISTP | | | ISFP | | | INFP | | | INTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 2 | 554.5 | 4 | 14 | 510.8 | 11 | 21 | 550.4 | 6 | 6 | 536.5 | 7 |
| Santa Fe | 3 | 490.7 | 9 | 7 | 496.4 | 8 | 13 | 469.2 | 12 | 2 | 520.0 | 5 |

| | ESTP | | | ESFP | | | ENFP | | | ENTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 3 | 419.0 | 16 | 9 | 508.8 | 12 | 26 | 517.1 | 10 | 5 | 551.4 | 5 |
| Santa Fe | 2 | 459.5 | 14 | 7 | 387.4 | 16 | 17 | 562.7 | 2 | 6 | 516.3 | 6 |

| | ESTJ | | | ESFJ | | | ENFJ | | | ENTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 10 | 484.9 | 14 | 18 | 520.1 | 9 | 15 | 534.3 | 8 | 1 | 439.0 | 15 |
| Santa Fe | 10 | 467.5 | 13 | 25 | 481.2 | 11 | 7 | 511.0 | 7 | 1 | 561.0 | 3 |

TABLE 15. RANK ORDER OF TYPES BY MEAN PSYCHIATRIC SCORES

| | ISTJ | | | ISFJ | | | INFJ | | | INTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 9 | 543.0 | 10 | 21 | 534.1 | 13 | 13 | 595.8 | 3 | 4 | 599.5 | 2 |
| Santa Fe | 9 | 456.4 | 10 | 18 | 439.2 | 14 | 6 | 578.0 | 4 | 2 | 616.5 | 2 |

| | ISTP | | | ISFP | | | INFP | | | INTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 2 | 607.5 | 1 | 14 | 539.4 | 12 | 21 | 575.0 | 6 | 6 | 577.5 | 5 |
| Santa Fe | 3 | 427.7 | 15 | 7 | 445.9 | 13 | 13 | 490.5 | 8 | 2 | 587.5 | 3 |

| | ESTP | | | ESFP | | | ENFP | | | ENTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 3 | 545.7 | 11 | 9 | 555.1 | 8 | 26 | 559.5 | 7 | 5 | 585.0 | 4 |
| Santa Fe | 2 | 486.0 | 9 | 7 | 352.1 | 16 | 17 | 530.5 | 7 | 6 | 543.0 | 5 |

| | ESTJ | | | ESFJ | | | ENFJ | | | ENTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 10 | 513.4 | 15 | 18 | 519.9 | 14 | 15 | 551.5 | 9 | 1 | 434.0 | 16 |
| Santa Fe | 10 | 449.8 | 12 | 25 | 455.4 | 11 | 7 | 537.9 | 6 | 1 | 663.0 | 1 |

TABLE 16. RANK ORDER OF TYPES BY MEAN SCORE ON TOTAL
STATE BOARD EXAMINATION

| | ISTJ | | | ISFJ | | | INFJ | | | INTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 9 | 2740.4 | 4 | 21 | 2479.6 | 14 | 13 | 2803.5 | 3 | 4 | 2885.0 | 1 |
| Santa Fe | 9 | 2328.0 | 12 | 18 | 2251.4 | 15 | 6 | 2714.8 | 3 | 2 | 3006.5 | 1 |

| | ISTP | | | ISFP | | | INFP | | | INTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 2 | 2828.5 | 2 | 14 | 2520.9 | 11 | 21 | 2698.9 | 5 | 6 | 2651.8 | 6 |
| Santa Fe | 3 | 2278.0 | 14 | 7 | 2398.7 | 8 | 13 | 2344.2 | 11 | 2 | 2656.0 | 5 |

| | ESTP | | | ESFP | | | ENFP | | | ENTP | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 3 | 2365.3 | 15 | 9 | 2600.4 | 10 | 26 | 2631.9 | 7 | 5 | 2628.4 | 8 |
| Santa Fe | 2 | 2360.0 | 10 | 7 | 1851.6 | 16 | 17 | 2683.2 | 4 | 6 | 2612.3 | 6 |

| | ESTJ | | | ESFJ | | | ENFJ | | | ENTJ | | |
|----------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> | <u>N</u> | <u>Mean</u> | <u>Rank</u> |
| U of F | 10 | 2502.9 | 13 | 18 | 2504.9 | 12 | 15 | 2620.7 | 9 | 1 | 2220.0 | 16 |
| Santa Fe | 10 | 2309.9 | 13 | 25 | 2360.1 | 9 | 7 | 2580.1 | 7 | 1 | 2923.0 | 2 |

TABLE 17. THE MEDIAN TEST COMPARING 16 MBTI TYPES ON STATE BOARD EXAMINATION SCORES

| Variable | Chi Square | df | P |
|-------------------|------------|----|-----|
| Medical Score | 12.55 | 15 | .70 |
| Surgical Score | 4.75 | 15 | .99 |
| Pediatric Score | 13.08 | 15 | .70 |
| Obstetric Score | 9.59 | 15 | .90 |
| Psychiatric Score | 13.17 | 15 | .70 |
| Total Score | 15.43 | 15 | .50 |

TABLE 18. MEDIAN BOARD SCORES BY TYPE

| Type | Medical | Surgical | Pediatric | Obstetric | Psychiatric | Total |
|------|---------|----------|-----------|-----------|-------------|-------|
| ESTJ | 465 | 477 | 482 | 470 | 503 | 2414 |
| ESTP | 432 | 458 | 516 | 433 | 508 | 2355 |
| ESFJ | 476 | 487 | 502 | 501 | 502 | 2513 |
| ESFP | 441 | 473 | 474 | 488 | 475 | 2409 |
| ENTJ | 456 | 533 | 534 | 500 | 549 | 2572 |
| ENTP | 496 | 479 | 524 | 541 | 550 | 2518 |
| ENFJ | 509 | 495 | 525 | 527 | 549 | 2635 |
| ENFP | 543 | 513 | 546 | 528 | 549 | 2762 |
| ISTJ | 513 | 516 | 539 | 555 | 507 | 2659 |
| ISTP | 463 | 442 | 490 | 491 | 441 | 2438 |
| ISFJ | 453 | 484 | 462 | 491 | 492 | 2421 |
| ISFP | 476 | 484 | 501 | 524 | 533 | 2457 |
| INTJ | 623 | 544 | 628 | 574 | 604 | 2931 |
| INTP | 523 | 473 | 564 | 550 | 583 | 2656 |
| INFJ | 537 | 570 | 546 | 546 | 607 | 2752 |
| INFP | 502 | 486 | 536 | 524 | 554 | 2568 |

Results showed type to be significantly related at the .05 level to Total Board scores and to Medical, Obstetric, and Pediatric subscale scores. Type was not significantly related to Surgical or Pediatric subscale scores. These results are summarized in Table 19. This analysis also supports rejection of the hypothesis that there is no relationship between performance on Boards or on subscales of Boards and psychological type.

TABLE 19. EFFECT OF TYPE ON STATE BOARD SCORES: WHITES ONLY

| Variable | df | F | P |
|-------------------|--------|------|------|
| Medical Score | 15/254 | 1.83 | .03 |
| Surgical Score | 15/254 | 1.17 | .29 |
| Pediatric Score | 15/254 | 1.54 | .09 |
| Obstetric Score | 15/254 | 2.02 | .01 |
| Psychiatric Score | 15/254 | 2.39 | .003 |
| Total Score | 15/254 | 2.10 | .005 |

Analysis of whites only produced results resembling those of the total population. That is, there were no significant ($P=.05$) interactions between type and school or between any pair of MBTI types. Also, white subjects at the University of Florida have a significantly higher ($P=.05$) Psychiatric score than white students at Santa Fe.

Consideration of Age

On the average, Santa Fe subjects were significantly older ($P=.05$) than University of Florida subjects. It was postulated that maturity

may influence performance on Boards. Therefore, all participants were placed into either an under 21 year old group or a 21 year old and over group. Both groups were analyzed for variation in scores according to type.

For the group under 21 years old, results showed subjects at the University of Florida scored significantly higher ($P=.05$) than subjects at Santa Fe on all subscales and on total Board score. Medical score, Psychiatric score, and total Board score were also significantly related to type for all subjects under 21 years. The Scheffé Method of multiple comparisons, however, found no differences (significant at .05 level) between any pair of the 16 MBTI type classifications or between any single or double pair of MBTI preferences. Interaction between school and type was not significant at the .05 level. Sources of variation for all subjects under 21 years are summarized in Table 20.

TABLE 20. EFFECT OF TYPE ON STATE BOARD SCORES: ALL SUBJECTS UNDER 21

| Variable | df | F | P |
|-------------------|--------|------|-------|
| Medical Score | 14/134 | 1.72 | .0565 |
| Surgical Score | 14/134 | 1.81 | .0417 |
| Pediatric Score | 14/134 | 1.18 | .2994 |
| Obstetric Score | 14/134 | 1.51 | .1171 |
| Psychiatric Score | 14/134 | 2.34 | .0065 |
| Total Score | 14/134 | 2.01 | .0208 |

For the group 21 years and older, only Psychiatric scores were significantly higher ($P=.05$) at the University of Florida than at Santa Fe. Unlike the group under 21 years, type was significantly related to Pediatric score. No other subscale score was significant at the .05 level for the group 21 and over. Again there were no significant ($P=.05$) differences between any pair of the 16 MBTI type classifications or between any single or double pair of MBTI preferences. There were insufficient subjects in the sample to test for interaction between school and type. Sources of variation for all subjects 21 years and over are summarized in Table 21.

TABLE 21. EFFECT OF TYPE ON STATE BOARD SCORES: ALL SUBJECTS 21 AND OVER

| Variable | df | F | P |
|-------------------|--------|------|-------|
| Medical Score | 15/119 | 1.26 | .2330 |
| Surgical Score | 15/119 | .47 | .9509 |
| Pediatric Score | 15/119 | 2.03 | .0182 |
| Obstetric Score | 15/119 | 1.71 | .0574 |
| Psychiatric Score | 15/119 | 1.63 | .0755 |
| Total Score | 15/119 | 1.51 | .1097 |

Consideration of Age and Race

Subjects were also grouped by race and age. Due to small sample size, blacks were not analyzed separately. Analysis of variance showed whites under 21 years at the University of Florida scored higher ($P=.05$) than whites of a similar age at Santa Fe on all subscales and on

total Board score. Medical score, Surgical score, Obstetric score, Psychiatric score, and total Board score were all significantly related to type. Again there were no significant ($P=.05$) differences between any pair of the 16 MBTI type classifications or between any single or double pair of MBTI preferences. There were not enough subjects in this sample to test for interaction between school and type. Sources of variation for white subjects under 21 years are summarized in Table 22.

TABLE 22. EFFECT OF TYPE ON STATE BOARD SCORES: WHITE SUBJECTS UNDER 21

| Variable | df | F | P |
|-------------------|--------|------|-------|
| Medical Score | 14/130 | 2.06 | .0178 |
| Surgical Score | 14/130 | 2.13 | .0140 |
| Pediatric Score | 14/130 | 1.17 | .3026 |
| Obstetric Score | 14/130 | 1.81 | .0427 |
| Psychiatric Score | 14/130 | 2.30 | .0077 |
| Total Score | 14/130 | 2.28 | .0083 |

Analysis of variance of the white group 21 years and over produced no results significant at the .05 level. Sources of variance for this group are summarized in Table 23.

Subjects who passed Boards were compared by age and race with subjects who did not pass Boards. A score of 350 on each subscale is considered passing in most states (including Florida) and was used to determine pass-fail in this study.

TABLE 23. EFFECT OF TYPE ON STATE BOARD SCORES: WHITE
SUBJECTS 21 YEARS AND OVER

| Variable | df | F | P |
|-------------------|-------|------|-------|
| Medical Score | 14/98 | .88 | .5844 |
| Surgical Score | 14/98 | .66 | .8172 |
| Pediatric Score | 14/98 | 1.70 | .0635 |
| Obstetric Score | 14/98 | 1.45 | .1393 |
| Psychiatric Score | 14/98 | 1.14 | .3310 |
| Total Score | 14/98 | 1.14 | .3327 |

A comparison of blacks to whites on pass-fail showed significant differences for both age groups. A disproportionate number of blacks are found among those failing Boards regardless of age. Results are summarized in Table 24.

TABLE 24. BLACKS COMPARED TO WHITES ON PASS-FAIL BY AGE

| Population | Chi Square | df | P |
|-----------------|------------|----|-------|
| Age 21 and over | 42.11 | 1 | .0001 |
| Age under 21 | 10.92 | 1 | .0011 |

A comparison of type by pass-fail showed no significant results at the .05 level. Type of those who fail Boards does not appear to be significantly different from the type of those who pass. Figures are summarized in Table 25.

TABLE 25. COMPARISON OF TYPE BY PASS-FAIL

| Population | Chi Square | df | P |
|-------------------|------------|----|-------|
| <u>Whites</u> | | | |
| 21 years and over | 13.62 | 15 | .5554 |
| Under 21 years | 12.73 | 14 | .5480 |
| <u>All</u> | | | |
| 21 years and over | 19.78 | 15 | .1801 |
| Under 21 years | 8.96 | 14 | .8327 |

Interpretation of Data

Limitations of the Study

Any interpretation of the data had to be done within the limits imposed by the study. Few blacks or males were available for the study and no attempt was made to analyze them separately. A trend in recent years to provide educational opportunities for minorities may have introduced a selection bias.

The graduates could not be selected at random. Selecting from those available in order to have all 16 types represented may have inserted some degree of bias into the findings.

Participants were from two schools in the same geographical area. The close proximity may or may not have affected the results. It was a possible limitation.

Insufficient numbers of each type restricted analysis and interpretation of the data.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Purpose of Study

The purpose of this study was to test the hypothesis that there exists a relationship between Jungian psychological type and performance on State Board Examinations for nursing.

Questions for Study

This study sought to find answers to the following questions:

1. Can psychological types be identified that perform significantly different than other types on Boards?
2. Are there types that perform consistently well on Boards or on sections of Boards?
3. Are there types that score consistently low on Boards or on sections of Boards?
4. Is performance on Boards by type independent of educational setting?

Design of the Study

This study was designed to explore the relationship between performance on the MBTI and performance on Boards.

The Participants

Three hundred and twelve graduates from two schools were involved in this study. This total includes 135 associate degree (Santa Fe Community College) graduates and 177 baccalaureate (University of Florida) graduates. Of the associate degree graduates, 20 were black females and nine were white males. All the rest were white females. Six of the baccalaureate graduates were black females and 10 were white males. The rest were white females.

Data on Psychological Type

The data on psychological type were obtained by using the Myers-Briggs Type Indicator. As a result of testing, participants were classified according to four dichotomous dimensions: 1. Extraversion-Introversion, 2. Sensing-Intuition, 3. Thinking-Feeling, and 4. Judging-Perceiving. Combining the four letters identifying participants' preferences resulted in sixteen type classifications.

Data on State Board Scores

The data from the State Board Examination consisted of scores on five subscales: 1. Medical Nursing, 2. Surgical Nursing, 3. Pediatric Nursing, 4. Psychiatric Nursing, and 5. Obstetric Nursing. The five subscale scores were collected individually and combined to determine a total Board score for each participant.

Analysis and Interpretation of the Data

The object of this analysis was to find the relationships, if any, between Board scores and personality type. It was also the object of this analysis to discover if these relationships were different for

baccalaureate graduates than for associate degree graduates.

More specifically the following seven null hypotheses were tested:

1. There is no significant relationship between performance on State Board Examination and psychological type.
2. There is no significant relationship between performance on the subscales of State Board Examination and psychological type.
3. There is no one type which performs consistently higher on the State Board Examination.
4. There is no one type which performs consistently higher on the subscales of the State Board Examination.
5. There is no one type which performs consistently lower on the State Board Examination.
6. There is no one type which performs consistently lower on the subscales of the State Board Examination.
7. Performance by type does not differ between Associate Degree and Baccalaureate Degree graduates.

No hypotheses were made concerning race, age, or sex because of the small number of graduates in each group, but the data on race, age, and sex were tabulated and used to check for confounding variables. There were significantly more blacks in the Santa Fe population. The Santa Fe population was older on the average and more variable with respect to age than the University of Florida population.

The Chi Square test of independence was used to compare the two

populations with respect to distribution of type. There were significantly more ESFJ types in the Santa Fe population. Otherwise, the distribution of types in the two populations appeared to be the same.

Using a two-factor Analysis of Variance and a .05 level of significance, there was no difference between the two populations on four of five subscale scores. There was a difference on Psychiatric score with University of Florida graduates having the highest mean.

Analysis of Variance was used to test for interaction between school and type. There was no significant ($P=.05$) interaction. Consequently, the hypothesis that performance by type would not differ between associate degree and baccalaureate degree graduates was not rejected.

An F value significant at the .05 level was obtained for MBTI type on the Analysis of Variance of total Board scores. The hypothesis of no relationship between performance on Board and psychological type was rejected.

Significant F values ($P=.05$) for type were obtained for Medical scores, Pediatric scores, Obstetric scores, and Psychiatric scores. Therefore, the hypothesis of no relationship between performance on subscales and psychological type could also be rejected.

No relationship, significant at the .05 level, could be found between performance on the Surgical subscale and type.

The Scheffé Method of multiple comparison was used to make all pair-wise comparisons generated by classifying subjects according to one, two, and four MBTI preferences. All pair-wise comparisons fell short of significance at the .05 level. The Median Test was also used to compare all 16 MBTI types on each of the five subscales. Again,

differences fell short of significance. Based on the Scheffé Method of multiple comparisons and on the Median Test, it was not possible to identify types which perform consistently higher or lower than other types on Boards or on subscales of Boards; therefore, hypotheses three through six were not rejected.

Analysis of Variance proceedings were done under several conditions: whites only, whites under 21, whites over 21, all subjects under 21, and all subjects over 21. Analysis under these conditions supported rejection of the hypothesis that there is no relationship between performance on Boards or on subscales of Boards and psychological type. University of Florida subjects under 21 years old scored significantly higher ($P=.05$) than subjects at Santa Fe on all subscales and on total Board score. Analysis of the white group 21 years and over produced no results significant at the .05 level.

A comparison of type by pass-fail using a Chi Square statistic showed no significant results at the .05 level. A comparison of blacks to whites on pass-fail showed that blacks fail more often than whites.

Conclusions

The results of the study warrant the following conclusions:

1. There is a relationship between Board scores and type.
2. This relationship exists for Medical, Pediatric, Obstetric, Psychiatric, and total Board score.
3. It is not possible to differentiate which types are likely to score high and which types are likely to score low with the small sample sizes used in this study.

4. Scores differ by school on the Psychiatric subscale.
University of Florida graduates have higher scores than Santa Fe graduates.
5. There is no evidence of interaction between type and school. Performance by type does not differ between the associate degree and baccalaureate degree graduates.
6. There are fewer significant differences on Board scores when the Analysis is restricted to whites only.
7. Black participants of all ages tend to fail more often than whites.
8. Younger (under 21) University of Florida graduates score higher on all subscales and on total Boards than younger Santa Fe graduates.
9. The effect of type on Board scores is stronger in the younger group (under 21) than in the older group.

Discussion

Analysis of Variance showed a relationship between performance on total Boards and type, and between performance on four of five subscales and type. There was no relationship between Surgical scores and type significant at the .05 level. The Surgical subtest involving more concrete, factual content, may require lower order thinking processes. Since the answers are more apt to be either right or wrong, the N has no use for his superior ability to form relationships; therefore, there would be no difference in performance by type.

Although there seems to be a relationship between type and performance on Boards, it was not possible to differentiate which types

are likely to score high and which types are likely to score low. Individual differences between types are probably slight and fall short of significance even though the aggregate of differences can be shown to be significant. Dividing samples according to 16 type classifications or single and double type preferences resulted in small sample sizes and restricted statistical treatment.

In theory, IN types should score higher than ES types on measures of aptitude and achievement. Failure to detect a significant difference between these two type categories may be due to insufficient subjects in each category. Since Boards test application of knowledge, it is also possible that IN types have no real advantage over ES types.

Scores differ by school on the Psychiatric subscale. This result probably reflects a difference in the instructional programs of the two schools.

There is no evidence of interaction between type and school. In other words, performance by type does not differ between the associate degree and baccalaureate degree graduates. This might be explained by the stability of type. That is, preferences are not easily affected by external conditions. Another possible explanation is that neither school uses type to identify learning styles and to plan programs accordingly.

Black participants of all ages tend to fail Boards more often than whites. Perhaps this represents a cultural bias of Boards. It could also reflect a selection bias. That is, a trend in recent years to provide educational opportunities for minorities may have caused educationally disadvantaged blacks to be included with better prepared whites.

There are fewer significant differences on Board scores when the

analysis is restricted to whites only. Since blacks tend to fail more often than whites and since blacks are predominantly -S-J types, it would appear that one of the variables producing a difference in the aggregate may well be the S-J factor.

Younger (under 21) University of Florida graduates score higher on all subscales and on total Boards than younger Santa Fe graduates. This may suggest that younger students with an additional two years academic experience have an advantage on Boards.

The effect of type on Board scores is stronger in the younger group (under 21) than in the older group. In theory, maturity in the use of type permits one to use whatever process is appropriate to the task. This in effect, would reduce the influence of type upon Board scores. The older group may have sufficient maturity to achieve this effect.

Recommendations

Research

Further study and research should be undertaken.

1. By increasing sample size and representativeness as to type, it would be possible to identify types scoring high and types scoring low on Boards and on subscales of Boards.
2. A large enough black sample is needed to compare the effects of type on Board scores within black groups and between black and white groups.

3. A study comparing types of blacks who passed Boards with types of blacks who failed Boards before desegregation would be useful.
4. More specific study of the Surgical scores is needed to identify why type performance differs here and not in the other areas.
5. Graduates from a wide geographical area should be studied to eliminate regional influences.

Education

1. If it is desirable to improve the performance of selected types, the learning styles of those types should be identified and reinforced.
2. Investigation is needed to discover which types among blacks fail Boards most often.
3. If in fact the effect of type is more pronounced for the younger group (under 21) then learning programs should be developed differently for the younger and for the older age groups to facilitate learning for both groups.
4. If it is desirable to differentiate baccalaureate performance from associate degree performance, both Psychiatric instructional programs should be evaluated.

APPENDIX A

CHARACTERISTICS OF MYERS-BRIGGS TYPES

TABLE 26. CHARACTERISTICS OF MYERS-BRIGGS PERSONALITY TYPES
IN HIGH SCHOOL*

ISTJ

Serious, quiet, earns his success by earnest concentration and unhurried thoroughness. Logical and orderly in his work and dependable in all he does. Sees to it that everything he touches is well organized. Takes responsibility of his own accord. Makes up his own mind as to what should be accomplished and works toward it steadily, regardless of protests or distractions.

ISFJ

Quiet, friendly, responsible and conscientious. Works devotedly to meet his obligations and serve his friends and school. Thorough and painstaking, accurate with figures, but needs time to master technical subjects, as reasoning is not his strong point. Patient with detail and routine. Loyal, considerate, concerned with how other people feel even when they are in the wrong.

ISTP

Quiet, reserved, a sort of cool onlooker at life, observing and analyzing it with detached curiosity and unexpected flashes of original humor. Interested mainly in mechanics, in cars, in sports and in business. Exerts himself only as much as he considers actually necessary, even if he happens to be a star athlete.

ISFP

Retiring, quietly friendly, sensitive, hates argument of any kind, is always too modest about his abilities. Has no wish to be a leader, but is a loyal, willing follower. Puts things off to the last minute and beyond. Never really drives himself about anything, because he enjoys the present moment and does not want it spoiled.

ESTP

Matter-of-fact, doesn't worry or hurry, always has a good time. Likes mechanical things, cars and sports, with friends on the side. A little blunt and insensitive. Can take school or leave it. Won't bother to follow a wordy explanation, but comes alive when there is something real to be worked, handled or taken apart. Can do math and technical stuff when he sees he will need it.

ESTJ

Practical, realistic, matter-of-fact, with a natural head for business. Likes the mechanics of things. Not interested in subjects that he sees no actual use for, but can apply himself when necessary. Is good at organizing and running school activities, but sometimes rubs people the wrong way by ignoring their feelings and viewpoints.

ESFP

Outgoing, easy-going, uncritical, friendly, very fond of a good time. Enjoys sports and making things, restless if he has to sit still. Knows what's happening and joins in helpfully. Literal-minded, tries to remember rather than to reason, is easily confused by theory. Has good common sense and practical ability, but is not at all interested in study for its own sake.

ESFJ

Warm-hearted, talkative, popular, conscientious, interested in everyone, a born cooperator and active committee member. Has no capacity for analysis or abstract thinking, and so has trouble with technical subjects, but works hard to master the facts in a lesson and win approval. Works best with plenty of praise and encouragement. Always doing something nice for someone in a practical way.

INFJ

Gifted and original student who succeeds through combination of intelligence, perseverance, and desire to please. Puts his best efforts into his work because he wouldn't think of doing less than his best. Quiet, conscientious, considerate of others, widely respected if not popular, but suffers socially from unwillingness to compromise where a principle or conviction is involved.

INFP

Particularly enthusiastic about books, reads or tells the parts he likes best to his friends. Interested and responsive in class, always attentive and quick to see what the teacher is leading up to. Has a warm, friendly personality but is not sociable just for the sake of sociability and seldom puts his mind on his possessions or physical surroundings.

INTJ

Has a very original mind and a great amount of drive which he uses only when it pleases him. In fields which appeal to his imagination he has a fine power to organize a job or piece of work and carry it through with or without the help of others. He is always sceptical, critical and independent, generally determined, and often stubborn. Can never be driven, seldom led.

INTP

Quiet, reserved, brilliant in exams, especially in theoretical or scientific subjects. Logical to the point of hair-splitting. Has no capacity for small talk and is uncomfortable at parties. Primarily interested in his studies and wouldn't care to be president of his class. Liked by his teachers for his scholarship and by the few fellow-students who get to know him for himself.

ENFP

Warmly enthusiastic, high-spirited, ingenious, imaginative, can do almost anything that interests him. Quick with a solution for any difficulty and very ready to help people with a problem on their hands. Often relies on his spur-of-the-moment ability to improvise instead of preparing his work in advance. Can usually talk his way out of any jam with charm and ease.

ENTP

Quick, ingenious, gifted in many lines, lively and stimulating company, alert and outspoken, argues for fun on either side of any question. Resourceful in solving new and challenging problems, but tends to neglect routine assignments as a boring waste of time. Turns to one new interest after another. Can always find excellent reasons for whatever he wants.

ENFJ

Responsive and responsible. Feels a real concern for what others think and want, and tries always to handle things with due regard for the other fellow's feelings and desires. Can lead a group discussion or present a proposal with ease and tact. Social, popular, active in school affairs, but puts time enough on his lessons to do good work.

ENTJ

Hearty, frank, able in studies and a leader in activities. Particularly good in anything requiring reasoning and intelligent talk, like debating or public speaking. Well-informed and keeps adding to his fund of knowledge. May be a bit too positive in matters where his experience has not yet caught up with his self-confidence.

* I. B. Myers, The Myers-Briggs Type Indicator Manual (Princeton: New Jersey: Educational Testing Service, 1962)

TABLE 27. EFFECTS OF THE COMBINATIONS OF PERCEPTION AND JUDGMENT IN
IN MYERS-BRIGGS PERSONALITY TYPES*

| People who prefer | SENSING + THINKING | SENSING + FEELING | INTUITION + FEELING | INTUITION + THINKING |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| focus their attention on | Facts | Facts | Possibili- ties | Possibili- ties |
| and handle these with | Impersonal analysis | Personal warmth | Personal warmth | Impersonal analysis |
| Thus they tend to be | Practical and matter- of-fact | Sociable and friendly | Enthusi- astic and insightful | Logical and ingenious |
| and find scope for their abilities in | Production Construc- tion Accounting Business Economics Law Surgery Etc. | Sales Service Customer relations Welfare work Nursing General practice Etc. | Research Teaching Preaching Counseling Writing Psychology Psychiatry Etc. | Research Science Invention Securities analysis Management Pathology Etc. |

* I.B. Myers, The Myers-Briggs Type Indicator Manual. (Princeton, New Jersey: Educational Testing Service, 1962), (17, p. 64).

APPENDIX B

DISTRIBUTION OF TYPES

TABLE 28. TYPE DISTRIBUTION OF SANTA FE WHITE MALES
21 YEARS AND OLDER
N=8

| ISTJ | | ISFJ | | INFJ | | INTJ | |
|------|-----|------|-----|------|-----|------|---|
| N=2 | 25% | N=0 | % | N=0 | % | N=0 | % |
| ISTP | | ISFP | | INFP | | INTP | |
| N=0 | % | N=1 | 13% | N=0 | % | N=0 | % |
| ESTP | | ESFP | | ENFP | | ENTP | |
| N=0 | % | N=0 | % | N=2 | % | N=0 | % |
| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
| N=1 | 13% | N=1 | 13% | N=1 | 13% | N=0 | % |

One ENFP male was less than 21 years old.

TABLE 29. TYPE DISTRIBUTION OF WHITE SANTA FE FEMALES
21 YEARS AND OLDER
N=57

| | | | | | | | |
|------|-----|------|-----|------|-----|------|----|
| ISTJ | | ISFJ | | INFJ | | INTJ | |
| N=3 | 5% | N=8 | 14% | N=2 | 4% | N=2 | 4% |
| ISTP | | ISFP | | INFP | | INTP | |
| N=2 | 4% | N=2 | 4% | N=3 | 5% | N=0 | % |
| ESTP | | ESFP | | ENFP | | ENTP | |
| N=1 | 2% | N=2 | 4% | N=6 | 11% | N=4 | 7% |
| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
| N=6 | 11% | N=10 | 18% | N=5 | 9% | N=1 | 2% |

TABLE 30. TYPE DISTRIBUTION OF WHITE SANTA FE FEMALES
LESS THAN 21 YEARS OLD
N=49

| ISTJ | | ISFJ | | INFJ | | INTJ | |
|------|---|------|-----|------|----|------|---|
| N=0 | % | N=5 | 10% | N=4 | 8% | N=0 | % |

| ISTP | | ISFP | | INFP | | INTP | |
|------|----|------|----|------|-----|------|----|
| N=1 | 2% | N=3 | 6% | N=9 | 18% | N=2 | 4% |

| ESTP | | ESFP | | ENFP | | ENTP | |
|------|----|------|----|------|-----|------|----|
| N=1 | 2% | N=4 | 8% | N=7 | 14% | N=2 | 4% |

| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
|------|----|------|-----|------|----|------|---|
| N=1 | 2% | N=9 | 18% | N=1 | 2% | N=0 | % |

TABLE 31. TYPE DISTRIBUTION OF SANTA FE BLACK FEMALES
21 YEARS AND OLDER
N=16

| | | | | | | | |
|------|-----|------|-----|------|----|------|---|
| ISTJ | | ISFJ | | INFJ | | INTJ | |
| N=2 | 13% | N=4 | 25% | N=0 | % | N=0 | % |
| ISTP | | ISFP | | INFP | | INTP | |
| N=0 | % | N=0 | % | N=1 | % | N=0 | % |
| ESTP | | ESFP | | ENFP | | ENTP | |
| N=0 | % | N=1 | % | N=1 | 6% | N=0 | % |
| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
| N=2 | 13% | N=5 | 32% | N=0 | % | N=0 | % |

TABLE 32. TYPE DISTRIBUTION OF SANTA FE BLACK FEMALES
LESS THAN 21 YEARS OLD
N=4

| ISTJ | | ISFJ | | INFJ | | INTJ | |
|------|-----|------|-----|------|---|------|---|
| N=2 | 50% | N=1 | 25% | N=0 | % | N=0 | % |
| ISTP | | ISFP | | INFP | | INTP | |
| N=0 | % | N=1 | 25% | N=0 | % | N=0 | % |
| ESTP | | ESFP | | ENFP | | ENTP | |
| N=0 | % | N=0 | % | N=0 | % | N=0 | % |
| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
| N=0 | % | N=0 | % | N=0 | % | N=0 | % |

TABLE 33. TYPE DISTRIBUTION OF UNIVERSITY OF FLORIDA
WHITE MALES 21 YEARS AND OLDER
N=10

| ISTJ | | ISFJ | | INFJ | | INTJ | |
|------|-----|------|-----|------|-----|------|-----|
| N=0 | % | N=1 | 10% | N=0 | % | N=0 | % |
| ISTP | | ISFP | | INFP | | INTP | |
| N=0 | % | N=0 | % | N=2 | 20% | N=0 | % |
| ESTP | | ESFP | | ENFP | | ENTP | |
| N=1 | 10% | N=0 | % | N=2 | 20% | N=0 | % |
| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
| N=2 | 20% | N=0 | % | N=1 | 10% | N=1 | 10% |

TABLE 34. TYPE DISTRIBUTION OF UNIVERSITY OF FLORIDA
WHITE FEMALES 21 YEARS AND OLDER
N=53

| | | | | | | | |
|------|----|------|-----|------|-----|------|----|
| ISTJ | | ISFJ | | INFJ | | INTJ | |
| N=3 | 6% | N=5 | 9% | N=4 | 8% | N=0 | % |
| ISTP | | ISFP | | INFP | | INTP | |
| N=1 | 2% | N=4 | 8% | N=5 | 9% | N=3 | 6% |
| ESTP | | ESFP | | ENFP | | ENTP | |
| N=0 | % | N=2 | 4% | N=8 | 15% | N=2 | 4% |
| ESTJ | | ESFJ | | ENFJ | | ENTP | |
| N=3 | 6% | N=6 | 11% | N=7 | 13% | N=0 | % |

TABLE 35. TYPE DISTRIBUTION OF UNIVERSITY OF FLORIDA
WHITE FEMALES LESS THAN 21 YEARS OLD
N=108

| ISTJ | | ISFJ | | INFJ | | INTJ | |
|------|----|------|-----|------|----|------|----|
| N=4 | 4% | N=13 | 12% | N=8 | 7% | N=4 | 4% |

| ISTP | | ISFP | | INFP | | INTP | |
|------|----|------|----|------|-----|------|----|
| N=1 | 1% | N=10 | 9% | N=14 | 13% | N=3 | 3% |

| ESTP | | ESFP | | ENFP | | ENTP | |
|------|----|------|----|------|-----|------|----|
| N=2 | 2% | N=7 | 6% | N=16 | 15% | N=3 | 3% |

| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
|------|----|------|-----|------|----|------|---|
| N=4 | 4% | N=12 | 11% | N=7 | 6% | N=0 | % |

TABLE 36. TYPE DISTRIBUTION OF UNIVERSITY OF FLORIDA
BLACK FEMALES OVER 21 YEARS OLD
N=5

| | | | | | | | |
|------|-----|------|-----|------|-----|------|---|
| ISTJ | | ISFJ | | INFJ | | INTJ | |
| N=1 | 20% | N=2 | 40% | N=1 | 20% | N=0 | % |
| ISTP | | ISFP | | INFP | | INTP | |
| N=0 | % | N=0 | % | N=0 | % | N=0 | % |
| ESTP | | ESFP | | ENFP | | ENTP | |
| N=0 | % | N=0 | % | N=0 | % | N=0 | % |
| ESTJ | | ESFJ | | ENFJ | | ENTJ | |
| N=1 | 20% | N=0 | % | N=0 | % | N=0 | % |

One ISTJ female was less than 21 years old.

APPENDIX C

BOARD SCORES COMPARED ACCORDING TO EI AND SN PREFERENCES

TABLE 37. COMPARISON OF TOTAL AND SUBSCALE MEANS BY MBTI QUADRANTS

| Score | IS (n=83) | IN (n=67) | ES (n=84) | EN (n=78) |
|-------------|--------------|--------------|--------------|--------------|
| Medical | 471.01 | 511.43 | 462.77 | 512.22 |
| Surgical | 485.57 | 511.61 | 475.79 | 500.19 |
| Pediatric | 492.93 | 542.94 | 484.93 | 539.33 |
| Obstetric | 496.31 | 534.37 | 480.74 | 531.49 |
| Psychiatric | 497.42 | 566.22 | 481.50 | 549.78 |
| Total | 2443.24 | 2652.88 | 2385.73 | 2633.01 |

TABLE 38. NINETY-FIVE PERCENT CONFIDENCE INTERVALS FOR DIFFERENCES IN MEANS

| <u>Comparison</u> | <u>Medical</u> | <u>Surgical</u> | <u>Pediatric</u> | <u>Obstetric</u> | <u>Psychiatric</u> | <u>Total</u> |
|-------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------------------------|
| IS-IN | -40.42 ⁺ ₋ 80.48 | -26.04 ⁺ ₋ 79.77 | -50.01 ⁺ ₋ 78.29 | -38.06 ⁺ ₋ 77.76 | -68.80 ⁺ ₋ 77.74 | -209.64 ⁺ ₋ 335.00 |
| IS-ES | 8.24 ⁺ ₋ 75.85 | 9.78 ⁺ ₋ 75.17 | 8.10 ⁺ ₋ 73.78 | 15.57 ⁺ ₋ 73.27 | 15.92 ⁺ ₋ 73.26 | 57.51 ⁺ ₋ 315.68 |
| IS-EN | -41.21 ⁺ ₋ 77.29 | -14.62 ⁺ ₋ 80.90 | -46.40 ⁺ ₋ 79.41 | -35.18 ⁺ ₋ 78.86 | -52.36 ⁺ ₋ 78.85 | -189.77 ⁺ ₋ 339.76 |
| IN-ES | -48.66 ⁺ ₋ 80.27 | 35.82 ⁺ ₋ 79.56 | 58.11 ⁺ ₋ 78.08 | 53.63 ⁺ ₋ 77.56 | 84.72 ⁺ ₋ 87.55 | 267.15 ⁺ ₋ 334.10 |
| IN-EN | - .79 ⁺ ₋ 81.63 | 11.42 ⁺ ₋ 80.90 | 3.61 ⁺ ₋ 79.41 | 2.88 ⁺ ₋ 78.86 | 16.44 ⁺ ₋ 78.85 | 19.87 ⁺ ₋ 339.76 |
| ES-EN | -49.45 ⁺ ₋ 77.06 | -24.40 ⁺ ₋ 76.37 | -54.40 ⁺ ₋ 74.96 | -50.75 ⁺ ₋ 74.45 | -68.28 ⁺ ₋ 74.44 | -247.28 ⁺ ₋ 320.73 |

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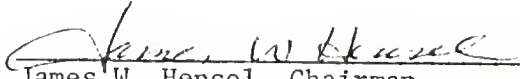
BIOGRAPHICAL SKETCH

David Dean Williams was born in Ohio. He received a Bachelor of Science in Nursing degree from Michigan State University and worked as a staff nurse in pediatrics.

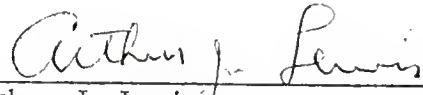
In 1970, after receiving a Master of Nursing degree, he worked as an instructor and later as an assistant professor of pediatric nursing. In 1973, he began full-time advanced study in education at the University of Florida.

Mr. Williams is currently employed as a graduate research associate at the University of Florida, College of Nursing.

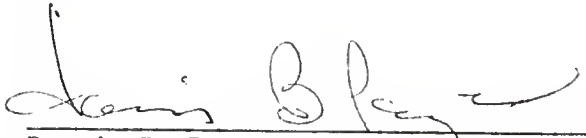
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James W. Hensel, Chairman
Professor of Education

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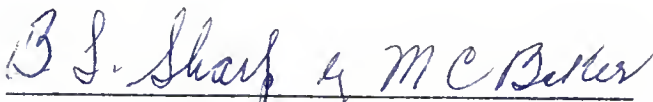

Arthur J. Lewis
Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Dorris B. Payne
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This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

June, 1975


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